

CLAIMS

What is claimed is:

- 5 1. A joining member for mechanically joining a skin to a supporting rib, the joining member comprising:
 - a first surface adapted for bonding to a surface of the skin via a layer of a first adhesive material; and
 - a second surface opposite the first surface and comprising a groove having an inner surface
10 adapted for receiving and bonding to an outer edge of the rib via a layer of a second adhesive material.

2. The joining member as recited in claim 1, wherein the first surface extends along a longitudinal axis of the joining member and is substantially planar.

3. The joining member as recited in claim 2, wherein the first surface comprises at least one ridge.

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4. The joining member as recited in claim 3, wherein an upper surface of the at least one ridge is elevated above the substantially planar first surface, and wherein the elevated upper surface determines a bond-line thickness of the first adhesive material.

10 5. The joining member as recited in claim 3, wherein the at least one ridge comprises a ridge positioned near a centerline of the first surface.

6. The joining member as recited in claim 3, wherein the first surface comprises a pair of ridges extending along the longitudinal axis of the joining member.

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7. The joining member as recited in claim 6, wherein the pair of ridges are positioned along opposite outer edges of the first surface.

8. The joining member as recited in claim 1, wherein the groove extends along a longitudinal axis
20 of the joining member, and wherein the inner surface of the groove comprises a pair of substantially planar sidewall surfaces.

9. The joining member as recited in claim 8, wherein the each of the pair of sidewall surfaces comprises a ridge.

10. The joining member as recited in claim 9, wherein each of the ridges has an upper surface
5 elevated above the corresponding substantially planar sidewall surface, and wherein the elevated upper surface determines a bond-line thickness of the second adhesive material.

11. The joining member as recited in claim 10, wherein each of the ridges is positioned at an edge of corresponding sidewall surface near an opening of the groove.

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12. The joining member as recited in claim 1, further comprising:

a pair of opposed side surfaces each having a plurality of notches allowing the joining
member to be easily curved or bent.

15 13. The joining member as recited in claim 1, wherein the skin forms at least part of an airfoil.

14. A structure for supporting two opposed skins, the structure comprising:

a rib having a pair of opposed outer edges;

a pair of joining members, each comprising:

a first surface adapted for bonding to a surface of one of the skins;

5 a second surface opposite the first surface and comprising a groove having an inner
surface adapted for receiving and bonding to an outer edge of the rib via an
adhesive layer;

wherein one of the outer edges of the rib extends into the groove of a corresponding one of
the pair of joining members and is bonded to the corresponding joining member via a
10 layer of a first adhesive layer formed in the groove of the corresponding joining
member; and

wherein the other outer edge of the rib extends into the groove of the other joining member
and is bonded to the other joining member via a second adhesive layer formed in the
groove of the other joining member.

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15. The structure as recited in claim 14, wherein a bond-line thickness of the first adhesive layer is determined by a pair of ridges extending outward from substantially planar sidewall surfaces of the groove of the corresponding joining member.

5 16. The structure as recited in claim 14, wherein a bond-line thickness of the second adhesive layer is determined by a pair of ridges extending outward from substantially planar sidewall surfaces of the groove of the other joining member.

17. The structure as recited in claim 14, wherein the first and second adhesive layers comprise
10 epoxy adhesive materials.

18. The structure as recited in claim 14, wherein the first surface of each of the joining members is adapted for bonding to the surface of the skin via a layer of an adhesive material.

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19. A method for forming a structure for supporting two opposed skins, the method comprising the steps of:

providing:

a rib having two opposed outer edges;

5 a pair of joining members, each comprising:

a first surface adapted for bonding to a surface of a skin;

a second surface opposite the first surface and comprising a groove having an inner surface adapted for receiving and bonding to an outer edge of the rib via an adhesive layer;

10 a pair of spacers having predetermined dimensions between outer edges;

inserting a first adhesive material into the groove of a first of the pair of joining members;

inserting one of the outer edges the rib into the groove of the first joining member;

inserting a second adhesive material into the groove the other joining member;

bringing the other joining member and the rib together such that: (i) the other outer edge of

15 the rib is inserted into the groove of the other joining member, and (ii) the spacers are positioned between the joining members on opposite sides of the rib; and

applying pressure between the joining members.

20. The method as recited in claim 19, wherein the applying comprises:

applying pressure between the joining members such that the outer edges of each spacer
contacts one of the joining members.